

this frequently occurs with the Algæ without the species being changed, though there have been botanists who have described Confervæ in the red and green states as different species.

M. Turpin also, in a new treatise, has derived the green and red colour of water, snow, earth, wood, marble statues, etc. etc. from green and red *Protococcus* globules, which, according to his idea, are true plants; but he has evidently observed them only in the passive state. ('*Quelques observations nouvelles sur les Protococcus, qui colorent en rouge les eaux des marais salants.*'—*Comptes Rendus* de 18 Nov., p. 626.)

XXXI.—*An Amended List of the Species of the Genus Ovis.*
By EDWARD BLYTH, ESQ. [With a Plate.]

[Concluded from p. 201.]

7. *O. Burrhel*, nobis. Smaller and more robust than the Nahoor, with shorter ears, and very dark horns; having no white upon it; and general colour dark and rich chestnut-brown, with the ordinary black markings upon the face, chest, and front of the limbs very distinct; tail apparently minute.

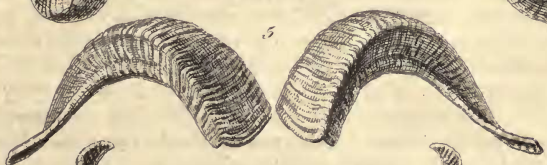
This handsome species bears pretty much the same relationship in appearance to the Nahoor, which the English breed of South Down domestic sheep bears to the Leicester breed, except that there is not so much difference in size. Length of the unique stuffed specimen in the museum of this Society, from nose to tail, 54 inches, but a foot less would probably give the dimensions of the recent animal, as the skin is evidently much stretched; height of the back 32 inches, from which also about 2 inches might be deducted; from muzzle to base of horn 8 inches, and ears $3\frac{1}{2}$ inches. The horns measure 20 inches over the uppermost ridge, and 10 round at base, having their tips 25 inches apart; but those of a specimen noticed in the '*Bengal Sporting Magazine*' (for 1839, p. 295) were $25\frac{1}{2}$ inches long, with a girth of $11\frac{1}{2}$ inches; and a horn of this same species, which I examined at Mr. Leadbeater's, had attained a length of 2 feet, and circumference of 11 inches at base, having a span of 14 inches from base to tip inside, and numbering at least ten indications of annual growth, and probably at least one more towards the tip, which could not be made out with certainty. The respective lengths of these were successively $10\frac{1}{2}$, $2\frac{1}{2}$, $2\frac{1}{4}$, $1\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{1}{2}$, 1, 1, $\frac{3}{4}$, and the basal $\frac{1}{2}$, inches. The coat of the Burrhel Sheep is rather long, and harsher than that of the Nahoor, having less wool concealed beneath it than in the Moufflon and Rocky Mountain species. The female is undescribed, and I have met with no other specimens than are here mentioned.

In the description of the preceding species, the principal differences are stated which distinguish the horns of that animal from those of the present one. The Burrhel's horns have all the ridges rounded off, though still sufficiently distinct, and the marks of annual growth are deeply indented, the horn bulging a little between them. Upon a front view, the backward curvature of the tips disappears altogether,

Ovis Polii.



O. Polii? sculptorum.



O. Californiana.



O. Vignei.



O. Nahoor.



O. Gmelini.



O. Burrhel.



and the animal has an imposing appearance, finer than that of the Nahoor. Its colour is much darker than that of the Moufflon.

The Burrhel would seem to inhabit a much loftier region of the Himalaya than the Nahoor, where it bounds lightly over the encrusted snow, at an altitude where its human pursuers find it difficult to breathe. It has the bleat of the domestic species, as indeed they all have, and is very shy and difficult of approach. Flocks of from ten to twenty have been observed, conducted by an old male, which make for the snowy peaks upon alarm, while their leader scrambles up some crag to reconnoitre, and if shot at and missed, bounds off a few paces further, and again stops to gaze. They pasture in the deep hollows and grassy glens. The Society's specimen was met with near the Boorendo Pass, at an altitude estimated to have been from 15,000 to 17,000 feet. The notice in the 'Bengal Sporting Magazine' refers to the same locality; and another notice most probably alludes to this species, in Lieut. Hutton's 'Journal of a Trip through Kunawar,' published in the 'Journal of the Bengal Asiatic Society' for 1839, p. 994*. Finally, Mr. Leadbeater informed me that the horn described as having been in his possession was brought from Nepâl, together with specimens of the Nahoor and Musk, and the skull and horns of a Himalaya Ibex, which I also examined.

8. *O. cylindricornis*, nobis (the Caucasian Argali). Col. Hamilton Smith notices this animal in his description of *O. Ammon* (published in Griffiths's English Edition of the 'Règne Animal,' vol. iv. p. 317), and writes me word that an individual died on landing it at Toulon, whither it had been brought by a French consul, who did not preserve the skull or skin, but set up the horns, which were quite fresh when he saw them. "Each horn was about 3 feet long, arcuated, round, as thick at the top as at the base, of a brown colour, nearly smooth, and about 15 inches in circumference. They were so heavy and unmanageable," writes Col. Smith, "that I could not lift both together from the ground, nor place them in that kind of juxta-position which would have given me an idea of their appearance on the head. I could not well determine which was the right or which the left horn. Circumstances prevented my taking a second view of them, as they arrived only the day before I left Paris, and they are now doubtless in the museum of that capital." In my former paper I alluded to this animal as probably distinct, and apparently allied to the Burrhel: the foregoing details confirm me in that opinion, and remove all doubt of its distinctness, as there is no other species to which they will at all apply. The sketch which Col. Smith has favoured me with represents a sheep-horn, apparently

* In the continuation of this 'Journal,' *ibid.* for 1840, p. 568, Lieut. Hutton identifies the "*Burul*" of the Boorendo with Mr. Hodgson's *Nahoor*: it is likely that both species are found there; but there can be no doubt whatever of their distinctness, as a comparison of the horns alone will suffice to show. "Of the *Ovis Ammon*," Lieut. Hutton observes, "I could learn nothing, save that an animal apparently answering to the description is found in Chinese Tartary, and I saw an enormous pair of its horns, nailed among other kinds, to a tree as an offering to Devi." These, however, may have belonged to *O. Poli*.—E. B.

of the same general form as those of the Burrhel and Nahoor; but the dimensions specified are very superior to those attained in the instance of either of the two Himalayan species adverted to, and I can only suppose that the (reverted?) tips had been broken off, and the truncated extremity worn smooth. The wild sheep of Caucasus and Taurus are at present little known, nor does any notice of this genus occur in the catalogue of Caucasian animals published by M. Ménétries; though it is nevertheless certain, from the vague incidental notices of various travellers, that some, and not unlikely several, exist. At Azaz, by the foot of Taurus, Mr. Ainsworth mentions having seen an animal which he designates *Ovis Ammon* (vide 'Travels in Assyria, Babylonia, and Chaldea,' p. 42).

9. *O. Gmelini*, nobis (the Armenian Sheep). This species belongs to the Moufflon group, but is yet very different from the Moufflon Sheep of Corsica. It is described and rudely figured in the *Reise durch Russland* (vol. iii. p. 486, and tab. lv.) of the younger Gmelin; and the skull and horns, forwarded by that naturalist to St. Petersburg, have been figured and described by Pallas in his *Spicilegia* (Fasc. xii. p. 15, and tab. v. fig. 1.). Messrs. Brandt and Ratzeburg erroneously identified it, at the suggestion of M. Lichtenstein, with the wild Cyprian species, the horns of which have a nearly similar flexure. Fine specimens of the male, female, and young, lately received by this Society from Erzeroom, enable me to give the following description:

Size of an ordinary tame sheep, with a remarkably short coat, of a lively chestnut-fulvous colour, deepest upon the back; the limbs and under parts whitish, with few traces of dark markings, except a finely contrasting black line of more lengthened hair down the front of the neck of the male only, widening to a large patch on the breast; and in both sexes a strip of somewhat lengthened mixed black and white hairs above the mid joint of the fore-limbs anteriorly, which corresponds to the tuft of *O. Tragelaphus*; tail small, and very slender: horns of the male subtrigonal, compressed, and very deep, with strongly marked angles and cross-striæ, diverging backwards, with a slight arcuation to near the tips, which incline inwards. As regards the flexure alone, but not the character of the horn, which is allied to that of the Common Ram, this handsome species links the Moufflon group with the Nahoor and Burrhel group. See Plate V.

Length nearly 5 feet from nose to tail; the tail 4 inches; from nose to base of horn 8 inches, and ears $3\frac{1}{2}$ inches. Horns (about full-grown, or nearly so,) 20 inches over the curvature, 10 round at base, 4 deep at base inside, their widest portion 2 feet apart, and tips 21 inches, with a span of $13\frac{1}{2}$ inches from base to tip inside; their colour pale. Around the eye and muzzle this species is whitish; the chaffron and front of the limbs are more or less tinged with dusky, and its coat is rather harsh, and fades considerably in brightness before it is shed. Female generally similar, but smaller, with no black down the front of the neck, and in the observed instances hornless. The lengthened black hair of the male is only 1 inch long, and that composing the tuft on the fore-limbs is so disposed that the latter is white in the centre, flanked with blackish.

According to M. Gmelin, this species is found only on the highest mountains of Persia. Its rutting season takes place in September, and lasts a month; and the female yeans in March, producing two or three lambs at a time: the males, he informs us, are very quarrelsome amongst each other, insomuch that he had been at one place where the ground was completely strewn with horns that had been knocked off in their contests; so that if any variation in the flexure of these horns had been observable, this industrious naturalist would doubtless have remarked it. Sir John McNeill informed me that "it appears to be the common species of the mountains of Armenia; occurring likewise on the north-west of Persia;" but the wild sheep of the central parts of Persia is evidently distinct, "having horns much more resembling those of the domestic Ram, being spiral, and completing more than one spiral circle. I think I am not mistaken in supposing," continues Sir John, "that I have also had females of this species brought to me by the huntsmen with small horns, resembling those of the ewes of some of our domestic sheep; but, on reflection, I find that I cannot assert this positively, though I retain the general impression." It is highly probable that a wild type of *O. Aries* is here adverted to, which would thus inhabit the same ranges of mountains as the wild common Goat (*C. Aegagrus*); and with respect to the circumstance of horns in the female sex, I may here remark that this character is very apt to be inconstant throughout the present group. It has already been noticed in the instance of *O. Nahoor*; and the elder Gmelin states that the females of *O. Ammon* are sometimes hornless, while those of the Corsican *O. Musimon* are generally so. The same likewise happens in different species of wild Goats, in the Goral of India, and in the prong-horned animal of North America; and even in the Gazelles, and other ovine-nosed species of what are commonly confused together under the name of *Antelope*, there have been instances of hornless males as well as females. A male Springbok of this description, as I am informed by Col. Hamilton Smith, was long in the possession of the Empress Josephine; and the specimen of *Ixalus Probaton*, Ogilby, in the museum of this Society, doubtless affords another example of the same phenomenon.

10. *O. Vignei*, nobis: the *Shà* (not *Snà*) of Little Thibet, and *Koch** of the Sulimani range between India and Khorassan. This fine species is closely allied to the Corsican Moufflon, but is much larger, with proportionally longer limbs, and a conspicuous fringe of lengthened blackish hair down the front of the neck, and not lying close, as in the Moufflon†. Its size, I am informed by Mr. Vigne, is that of a large Fallow Deer; and from the general appearance of these animals, their length of leg, and swiftness on the

* *Koch* appears to be generic for Sheep, and the same word as *Kutch* in "*Kutch-gar*," or *Koosh* in "*Koosh-gar*," applied to *O. Polii*.—E. B.

† At least, as in the Moufflon in summer garb; for, in winter, it hangs out loosely also in the latter species, but is much more copious than apparently in *O. Vignei*, and also resembles less the pendent hair of the same part in *O. Tragelaphus*.—E. B.

mountains, "they reminded me," remarks that gentleman, "of Deer rather than Sheep."

The general colour of this animal, to judge from an elaborately finished painting, taken from a living individual in its native country by Mr. Vigne, to whom we are indebted for all we know concerning the species, is a rufous brown, apparently not so deep as in the Moufflon; the face livid, or devoid of the rufous tinge of the body, and not terminated by a white muzzle, as in the Moufflon Sheep: the belly is white, separated by a black lateral band; and the limbs are brown, not mottled, as in the Moufflon, but with a whitish ring immediately above each hoof, then a dark ring, and above this a little white posteriorly, as in the Nylghau. The fringe in front of the neck is doubtless peculiar to the male, and the hairs of it would appear to be 4 or 5 inches long, and hang loosely. Tail about 6 inches long, and slender, apparently resembling that of the Armenian species rather than the Moufflon's.

A full-grown pair of horns measure $32\frac{1}{2}$ inches over the curvature, and 11 inches round at base; their widest portion apart, measured outside, is 2 feet, the tips converging to 8 inches, and span from base to tip also 8 inches: they are subtriangular, much compressed laterally, the anterior surface $2\frac{3}{4}$ inches broad at base, with its side-angles about equally developed, and the posterior part of the section tapers rather suddenly to a somewhat acute angle; eight years of growth are very perceptible, which successively give 12, 7, 4, 3, 3, $1\frac{1}{2}$, $1\frac{1}{2}$, and $\frac{1}{2}$, inches; they bear considerable resemblance to those of the Moufflon Sheep, but differ in being very much larger, and in the circumstance of the outer front-angle being as much developed as the inner one; and they have not the slightest tendency to spire, but, describing three-fourths of a circle, and originally diverging as in a common Ram, they point towards the back of the neck, somewhat as in *O. Tragelaphus*. Another and younger specimen, however, has a decided spiral flexure outward, more especially towards the tip, and has also the outer angle much less developed than in the corresponding terminal portion of the former. This pair had grown to 11 inches long, with the tips $14\frac{1}{2}$ inches apart; only one year's growth, and that apparently incomplete, is however exhibited, and the curvature is likewise less than in the older specimen. The portion of skull attached is also so much smaller, that I think it prudent to hesitate in identifying it as specifically the same. The posterior margins of the orbits are but $4\frac{1}{2}$ inches apart, whereas in the other they are $5\frac{1}{2}$ inches. There are no materials for extending the comparison, but a few more dimensions may be given of the smaller one. The greatest width of this skull, at the posterior portion of the *zygoma*, is 5 inches, and the orbits are $3\frac{1}{4}$ inches distant where most approximated: the series of 5 developed molars occupied $2\frac{3}{4}$ inches; width of second true molars apart, posteriorly and externally, $2\frac{1}{4}$ inches; of anterior false molars, measured outside and before, $1\frac{1}{8}$ inch; greatest width of palate $1\frac{3}{4}$ inch, and from front of first false molar to anterior portion of occipital *foramen*, $5\frac{3}{4}$ inches. Mr. Vigne, indeed, assures me that the adult has only five grinders on each side of both jaws, as in the Chirew, which, if nor-

mal, would make an important distinction, as the smaller specimen would undoubtedly have developed a third true molar, and possesses three false ones; whereas it is in one of the latter that the Chirew is deficient. I am inclined, however, to regard the two specimens as belonging to the same species, since I have observed analogous differences in the mere flexure of the horn in different Corsican Moufflons; but it was at all events proper to indicate the disparity.

“Vast numbers of this species,” relates Mr. Vigne, “are driven down by the snow in winter to the branches of the Indus, near Astor, at the southern extremity of Little Thibet, where the river breaks through the chain of the Himalaya. I once saw a young one, apparently of this species, in Persia, but took no memorandum of it at the time; it was dirty and draggled, but, I think, was covered with short wool.” I have great pleasure in dedicating this species to that gentleman*.

11. *O. Musimon*, Linnæus: the Moufflon Sheep of Corsica and Sardinia, but not, there is reason to suspect, of the Levantine countries. It is unnecessary to give a detailed description of this beautiful little species, though I may mention that the fine living male in the Gardens measures 39 inches from nose to tail, the tail 5 inches; from nose to base of horn 7 inches; ears 4 inches; neck, from posterior base of horn to the abrupt angle of its insertion, 8 inches, and thence to base of tail 21 inches; height at the shoulder $2\frac{1}{4}$ feet. The horns of this individual are remarkable for not springing in the least degree, whence they point towards the back of the neck: they measure 21 inches over their curvature, and $8\frac{1}{4}$ inches round at base, being in their fifth year of growth; their widest portion apart

* The Wild Sheep of the Parapomisan range, or Hindu Koosh mountains, described in ‘Journ. As. Soc. Beng.’ for 1840, p. 440, has been identified by Mr. Vigne as, “without doubt,” the same as the above *O. Vignei*, notwithstanding certain apparent discrepancies. “Adult male 3 feet 4 inches at shoulder, and 5 feet 4 inches from nose to base of tail. Girth of body, measured behind shoulder, 4 feet: head 1 foot: horns $2\frac{1}{2}$ feet round the curvature, and 12 inches in circumference at base, turning spirally backwards and downwards, with the points inclining forwards. A large beard from the cheeks and under-jaw, divided into two lobes. Neck ponderous, 14 inches long and 24 inches in circumference: it has no mane above. General colour pale rufous, inclining to gray, and fading off to white beneath. *Muzzle white*; beard on either lobe white, connected to a streak of long black flowing hair, reaching to the chest. Legs covered with white short hair; belly white; tail small, short, and together with the buttocks white. The female is inferior in size, and not so much of a rufous colour, with small horns, inclining backwards and outwards, about 6 inches in length. The lambs, which are produced in May and June, are the colour of the female, but have a dark stripe down the back, and in front of the fore-legs.” “I have now,” writes Capt. Hay, “three lambs of this species in my room, perfectly domesticated; but such places as they attempt to climb, show the nature of the mountains they inhabit. What think you of a couple of them setting to work to climb my chimney, nearly perpendicular, but with projecting bricks here and there?” It is noticed that this animal has the usual number of molars, six on each side of both jaws; and I understand that there is a stuffed specimen in the Paris Museum.—E. B.

is 15 inches, and at the tips 6 inches; but another pair, upon the stuffed specimen in the museum, which show the more usual slight spirature, are 26 inches long, having the widest portion 14 inches apart, and the tips as much as 12 inches: this pair shows seven years of growth, and their development was evidently completed, though they are only 7 inches in girth at base. The female has seldom any horns, which, when they exist, are ordinarily about 2 inches long.

The character of the horn of the Moufflon is nearly the same as that of the domestic Ram, only that it is never so much prolonged, nor indeed to more than two-thirds of a circle: the inner front edge is acute to near the base, where the outer one approaches to an equality with it; the first half being thus unequally triangular, and the remainder much compressed, with strongly marked *rugæ*, and having the inner surface of the horn concave. It has always appeared to me, however, that the specific distinctness of the Moufflon is very obvious, and I doubt whether it has contributed at all to the origin of any tame race. That it interbreeds freely with the latter, under circumstances of restraint, is well known; but we have no information of hybrids, or *Umbri*, as they are called, being ever raised from wild Moufflons, though the flocks of the latter will occasionally graze in the same pasture with domestic sheep, and all but mingle among them. The male of this animal is denominated in Corsica *Mufro*, and the female *Mufra*, from which Buffon, as is well known, formed the word *Moufflon*: and in Sardinia the male is called *Murvoni*, and the female *Murva*, though it is not unusual to hear the peasants style both indiscriminately *Mufion*, which (as Mr. Smyth remarks in his description of that island,) is a palpable corruption of the Greek *Ophion*. It is sometimes stated, but I do not know upon what authority, that a few of these animals are still found upon the mountains of Murcia.

12. The Cyprian Moufflon, figured and described by Messrs. Brandt and Ratzeburg from a specimen in the Berlin Museum, and contrasted by them with M. F. Cuvier's figure of the Corsican animal, is probably a distinct species, intermediate to *O. Musimon* and *O. Gmelini*: its horns have more the curvature of those of the latter species, but are not so robust, and curve round gradually backward from the base, instead of at first diverging straightly, as in *O. Gmelini*; but the colour of the coat would appear to resemble that of the Corsican Moufflon, only without the rufous cast, and the specimen figured wants also the saddle-like triangular white patch, which is seldom* absent in the Moufflon of Sardinia and Corsica. The *Tra-*

* Indeed *never*, as I now suspect, from observing that the hair composing this triangular white patch in the Moufflon, though even with the rest of the coat in summer, is in winter very much lengthened beyond the rest, forming a sort of whorl, and imparting a singular aspect to the animal when viewed otherwise than laterally. At the same season, the Moufflon has a considerable standing mane of lengthened black hair on the nape and fore-quarters, and that on the front of the neck is very copious and projecting, being directed forwards from the lower part, and downwards from the upper portion of the fore-neck. It is remarkable that the same lateral whorl of lengthened white hairs occurs in certain breeds of domestic sheep. There is now, for instance, in the Zoological Gardens, Regent's Park, a pair of sheep

gelaphus of Belon, it is true, observed by that author in Candia and in Turkey, is described by him to have "horns similar to those of Goats, but sometimes gyrated like those of a Ram"; yet the fact of a nearly similar flexure of horn to that represented by Messrs. Brandt and Ratzeburg, proving to be of normal occurrence in the allied Armenian wild Sheep, confers additional probability on the supposition that the Berlin specimen of the Cyprian Moufflon has also normally curved horns, which alone would go far to establish its claim to rank as a species, in which case it might bear the appellation of *O. Ophion*.

13. *O.* — : *Ixalus Probaton*, Ogilby. I stated in my former paper an opinion, to which I am still disposed to adhere, that this animal is no other than a genuine sheep, but specifically distinct from any at present known: the specimen had long lived in captivity, as is obvious from the manner in which its hoofs had grown out; but whereas I formerly sought to account for its absence of horns, by ascribing this to probable castration at an early age, I am now inclined to consider that this abnormality—for such there is every reason to suppose it—was individually congenital, as in other rare cases before alluded to. The Armenian wild Sheep approaches more nearly to this species than any other as yet discovered; so much so, that before actually comparing them I thought that they would prove to be the same; but they are nevertheless distinct, as is particularly shown by the longer and less slender tail of the present animal, and the very different texture of its coat: the absence of dark markings on its face and limbs may prove to be an individual peculiarity. The specimen is of the size of a large tame Sheep, and entirely of a chestnut fulvous colour, dull white beneath and within the limbs, as also on the lips, chin, lower part of the cheeks, and at the tip of the tail. From nose to base of tail it measures about 50 inches,—the tail half a foot, and height of the back $2\frac{1}{2}$ feet. From nose to rudiment of horn 9 inches, and ears 4 inches: the vestiges of horns, which exactly resemble those found upon many breeds of tame Sheep, are 2 inches apart. Upon the minutest examination of the specimen, I can perceive no character whatever to separate it from the genuine Sheep, nor any distinction more remarkable than the trivial circumstance of its chaffron not being bombed, as usual, which however is equally the case with *O. Tragelaphus*. I have been favoured, however, by Col. Hamilton Smith with a drawing of an animal observed by himself on the banks of the Rio St. Juan in Venezuela, which appears to accord so nearly with *Ixalus Probaton*, except in the particular of bearing horns similar to those of the Rocky Moun-

from the West Indies, which, during the winter, have been clad with a copious fleece of a rufous brown colour, through which these long white hairs projected and were very conspicuous, contrasting with the rest: at the approach of spring the woolly fleece was shed, and succeeded by a coat of hair like that of the various wild species. These sheep are hornless, and have the usual long body of the domestic races; their tail is rather short, but more than twice as long as the Moufflon's, and the chaffron is much bombed. From these facts I infer the near affinity, rather than the identity, of the latter with the domestic species, the aboriginal type of which would certainly also exhibit much long hair pendent from the front of the neck, as retained in the Icelandic and some other breeds.—E. B.

tain Goat, that its absolute identity is probable, in which case it would be curious that a species so very nearly allied to the genus *Ovis* should yet differ from it so considerably in the character specified. The South American animal adverted to is the *Aploceros Mazama* of Col. Smith, and is probably congenerous with the *Pudu* of the Chilian Andes mentioned by Molina, (the existence of which would appear to have been lately re-ascertained by M. Gay,) and also with the fossil *Antilope Mariquensis* of Dr. Lund: there would indeed appear to be other living species of this type, more or less distinctly indicated by different authors.

14. *O. Aries*, Linnæus: the Domestic Sheep. Assuming that different species have commingled to produce this animal, as appears to be very evident in the instance of the Dog, it is still remarkable that we have certainly not yet discovered the principal wild type, or indeed any species with so long a tail as in many of the domestic breeds, which I cannot doubt existed also in their aboriginal progenitors: nothing analogous is observable among the endlessly diversified races of the domestic Goat, which all appear to have been derived exclusively from the Caucasian *C. Ægagrus*; and as in my former paper I suggested the probability that a wild Sheep more nearly resembling the domestic races than any hitherto discovered would yet occur somewhere in the vicinity of the Caucasus, it now appears that such an animal does exist in central Persia, as noticed in my description of *O. Gmelini*: nor should it be forgotten that Hector Boëtius mentions a wild breed in the island of St. Kilda, larger than the biggest Goat, with tail hanging to the ground, and horns longer and as bulky as those of an Ox*. Pennant remarks upon this subject, that such an animal is figured on a bas-relief, taken out of the wall of Antoninus, near Glasgow.

Of all the wild species of true *Ovis* that have been here described, the Rass [*Kutch-gar*] of Pamîr approaches nearest to *O. Aries* in the character of its horns, though differing in one particular, besides size, that has been pointed out; namely, that the two front angles are about equally developed; whereas in *O. Aries*, as in the Moufflon, the inner angle is more acute to near the base. Some experience in the deduction of the specific characters of sheep-horns enables me to state with confidence, that the normal character of the long-tailed domestic breeds of Europe, and also of most other breeds, is intermediate to that of the Rass and that of the Moufflon, combining the flexure and the prolongation of the former with the section of the latter, but becoming proportionally broader at the base than in either; more as in the Argalis of Siberia, Kamtschatka, and North America. That *O. Aries* is totally distinct from all, I have been long perfectly satisfied, and examination of the Rass in particular has strongly confirmed me in this opinion. I think it likely, however, that more than one wild species have commingled to form the numerous domestic races, though certainly not any that have been described in this paper. It is not very long since the question was habitually

* Two *crania* of sheep, apparently male and female, from the Irish peat, in the possession of the Earl of Enniskillen, and exhibited some time ago at a meeting of the Geological Society, are probably of this race.

discussed, whether the tame Sheep had descended from the Argali of Siberia or the Moufflon of Corsica; and now that so many more indisputably distinct wild species have been added to the catalogue of this genus, it is probable that we are still very far from having ascertained the complete existing number, but that several more yet remain to be discovered upon the lofty table-lands and snowy mountains of middle Asia, from the Caucasus and Taurus to the Altai, and among them, it is very probable, some much more nearly allied to the domestic races than any at present known.

The whole of the foregoing animals appertain to my subgeneric group *Ovis*, as distinguished from *Ammotragus*, which latter is characterized by the absence of suborbital sinuses, like the Goats, but differs from the latter by possessing interdigital *fossæ*, as in other Sheep. This difference between the Goats and Sheep appears to have been first noticed by Pallas, and has since been descanted upon by Prof. Gén  in vol. xxxvii. of the *Memorie della Reale Accademia delle Scienze di Torino*. The fact of such a diversity in genera so nearly allied in habitat as the Goats and Sheep, renders the problem of the utility of the structure in question somewhat difficult of solution. The species upon which I found the subgenus *Ammotragus*, has decidedly an Ovine, rather than a Caprine aspect, when viewed alive: the male emits no stench, as in the Goats; the bleat is precisely that of *Ovis*, and the animal butts like a Ram, and not like a Goat. Unlike the other species of admitted wild Sheep, as well as the long-horned or true wild Goats, it has a concave chaffron, and no markings on the face and limbs: its tail is rather long, which is the case in no species of *Capra*, and is also remarkable for being tufted at the extremity. The indigenous habitat, North Africa, is a further peculiarity in the genus in which it is here placed, though two species of wild Goats respectively inhabit Upper Egypt and the snowy heights of Abyssinia.

15. *O. Tragelaphus*, Pallas: the African Goat-Sheep. This animal appears to vary considerably in size, some exceeding a Fallow Deer in stature, while others are much smaller. It has no beard on the chin, like the true Goats, but is remarkable for the quantity of long hanging hair in front of the neck, and on the upper part of the fore-limbs, the former attaining in fine males to about a foot in length, and the latter to 9 inches; there is also some lengthened hair at the setting on of the head, and a dense nuchal mane, the hairs of which are 3 inches long, continued over the withers till lost about the middle of the back. General colour tawny or yellow-brown. Horns moderately stout, turning outwards, backwards, and so inwards, with the tips inclining towards each other.

The splendid male in the British Museum measures 5 feet from nose to tail, and tail 9 inches, or with its terminal tuft of hair 13 inches; height of the back $3\frac{1}{2}$ feet, but the living animal would not have stood so high by several inches; from muzzle to base of horn 11 inches, and ears 5 inches. The finest pair of horns which I have seen are in the same collection, and measure 25 inches over the curve, $10\frac{1}{2}$ round at base, with an antero-posterior diameter of $2\frac{1}{2}$.

inches inside; they diverge to 23 inches apart, measuring outside, at a distance of 6 inches from the tips, which latter return to 15 inches asunder; their span from base to tip inside is 13 inches; at base they are closely approximated, but not quite in contact. General form subquadrangular for nearly a foot, then gradually more compressed to the end, and having a very deep longitudinal furrow for the greater portion of their length outside, above which the horn bulges: there is a mark of annual growth at $1\frac{1}{4}$ inch from the base, another $1\frac{1}{2}$ inch further, and a third after an interval of 3 inches; but the rest are too indistinct to be made out with certainty among the wrinkles of the horn. A large pair of female horns were 16 inches long; $7\frac{1}{2}$ round at base; their widest portion apart, near the tips, 19 inches; and the tips $17\frac{1}{4}$ inches: their surface is marked with broad transverse indentations, which in the males ordinarily become more or less effaced with age. The female of this species is a third smaller than the other sex; and a lamb in the collection of this Society is extremely kid-like, with the spinal mane upon the neck and shoulders very conspicuous, but no lengthened hair on the fore-neck and limbs: in the half-grown male, the latter especially is still not much developed.

This species is well known as the *Aoudad* of the Moors, and the *Kebsb* of the Egyptians; it is also, according to Rüppell, the *Tedal* of the inhabitants of Nubia, which is doubtless the same as *Teytal*, applied by Burckhardt to the wild Goat of that region, in addition to the word *Beden*, which (in common with Rüppell and others) he also assigns to the latter. Sir Gardner Wilkinson, however, confirms Burckhardt, by informing us that the Goat referred to is called in Arabic *Beddan*, or *Taytal*, the former appellation referring to the male only. This author adds, that the present species "is found in the eastern desert, principally in the ranges of primitive mountains, which, commencing about lat. $28^{\circ} 40'$, extend thence into Ethiopia and Abyssinia." According to M. Rüppell, "it is found in all North Africa above 18° in small families, and always upon the rocky hills;" frequenting the steepest and most inaccessible crags amid the woods and forests of the Atlas, and descending only to drink. It is a wonderfully agile leaper, even more so than the wild Sheep and Goats generally, and is remarkable for always browsing, in preference to grazing. The *Ovis ornata*, figured by M. Geoffroy in the great French work on Egypt, would appear to be merely a small-sized individual*.

* The "Wild Sheep" of Tenasserim, mentioned by Captain Low (in Journ. Roy. As. Soc. for 1836, p. 50) as abundant in that region, is most probably the *Kemas hyllocrius* of Mr. Ogilby, or *Warry-a-too* of the Chatgaon hills, which is also more or less common throughout the Malabar, Coromandel and Vindhayan ranges of Peninsular India, where it is known as the "Jungle Sheep" to British sportsmen, having precisely the bleat of this genus. Vide Bevan's 'Thirty Years in India,' ii. 267. This author remarks its being very common in Wynaud. A female represented (though very indifferently) in one of Gen. Hardwicke's unpublished drawings in the British Museum, from a specimen killed in Chatgaon, is clearly identical in species with the male specimen in the Zoological Society's Museum, which was received from the Neelgherries. Mr. Ogilby has rightly classed this ani-

The following may serve for definitions of the various ascertained species of wild Sheep that have been here described:—

1. *O. Polii*, Blyth. *O. cornibus maximis triquetris, angustis altissimisque; angulis anterioribus æqualibus: extrorsum spiraliter gyratis, et tam prolongatis quam sunt cornua Arietum domesticorum longissima: sulcis transversim indentatis; colore pallido.* Animal non cognitum est, sed *O. Ammoni* magnitudine saltem haud inferius. Habitat apud planitiem elevatam *Pamir* dictam, in Asia centrali.

2. *O. montana*, Desmarest. *O. cornibus maximis triquetris, crassissimis, et sæpe inter angulos tumidis, ad apicem compressioribus; sulcis transversim indentatis; deorsum et antrorsum gyratis ad parallelum, apicibus extrorsum eductis: colore pallido, sed sæpe rufo-brunneo suffuso.* Animal ad magnitudinem *Cervi Elaphi* appropinquans, sed artubus brevioribus; pilis griseo-fulvis pallidis, maculis genericis super facie, pectore, artubusque fuscis; caudâ brevissimâ, et disco albescente circumdatâ. Habitat apud Americae Septentrionalis montes, occidentalem versus.

3. *O. Ammon*, Pallas. Diversitas hujus speciei ab præcedente

mal with the *Jharal* of Mr. Hodgson (which is decidedly the *Capra Jemlaica* of Col. H. Smith) and the *Goral* of Gen. Hardwicke; which two latter species, if not the first also (as is most probable), are very remarkable for having constantly four mammæ, wherein they differ from all the allied forms. It is necessary, however, to remark here, that I do not consider the *Surow*, or *Thar* of Mr. Hodgson, and its congener the *Cambing-outang* of Sumatra, to be nearly allied to the Goats and Sheep. The members of the subdivision *Kemas*, Ogilby (from which I exclude the Chanois), are besides distinguished from the true Goats, as a subgenus of which generic group I prefer to rank them, by having short horns, nearly as large in the female as in the male, always cylindrical at the tips, and forming a prolongation of the plane of the visage; no beard on the chin; comparatively long limbs; and by having the chaffron straight, or even concave, in lieu of being bombed. The *K. hylocrius*, which has never been described, is rather smaller than the *Jharal*, with a very short, coarse, and somewhat crisp coat, of a grizzled purplish chocolate colour, inclining to olive on the face: the horns diverge much less, having more the direction of those of *K. Goral*, but are moderately thick at base, and very sheep-like, bulging externally more than in *K. Jemlaicus*, with even an indistinct trace of an outer front-angle; they are indented with numerous cross-channels, and have little more than a tendency to exhibit the pendent knobs in front, conspicuous in those of the *Jharal*; their colour is dull black; at base they are 1 inch apart, diverging to $9\frac{1}{2}$ inches at the tips, with a length of 9 inches over the slight curvature. The animal stands above $2\frac{1}{2}$ feet at the back, and measures about 4 feet from nose to tail; the tail 3 inches, or 5 inches to the end of the hair; from nose to base of horn 9 inches, and ears 5 inches. There is a raised dorsal line, darker along the nape and fore-quarters; and the hairs of the coat, which are very slightly crumpled, and lie roughly, from each hair having a stiff curvature, are grizzled chocolate and yellow-gray, the former colour much predominating; there is some dull white in front of the neck, lower parts, and inside of the limbs; and the feet are blackish anteriorly, with a black patch also a little above the callous space on the fore-knees: tail the same colour as the back. The female would appear to differ only in having the horns not quite so thick and large.—E. B.